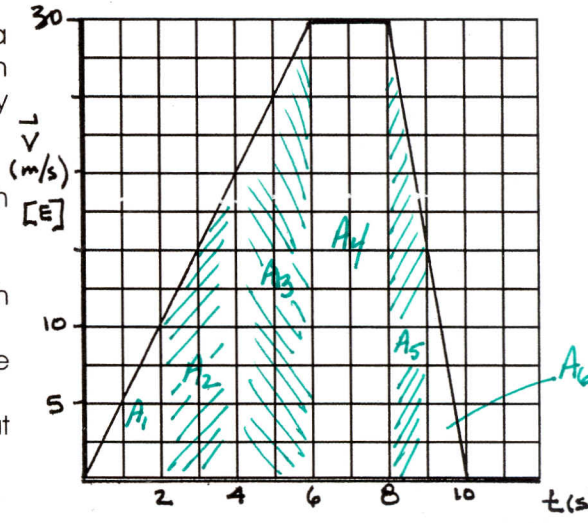
MORE ON VELOCITY....

1. The cheetah is the fastest land animal. It can reach a speed of 112 km/h (~31 m/s) in short sprints, but it can only maintain this speed over small time intervals. Study the velocity-time graph for a cheetah chasing its prey.



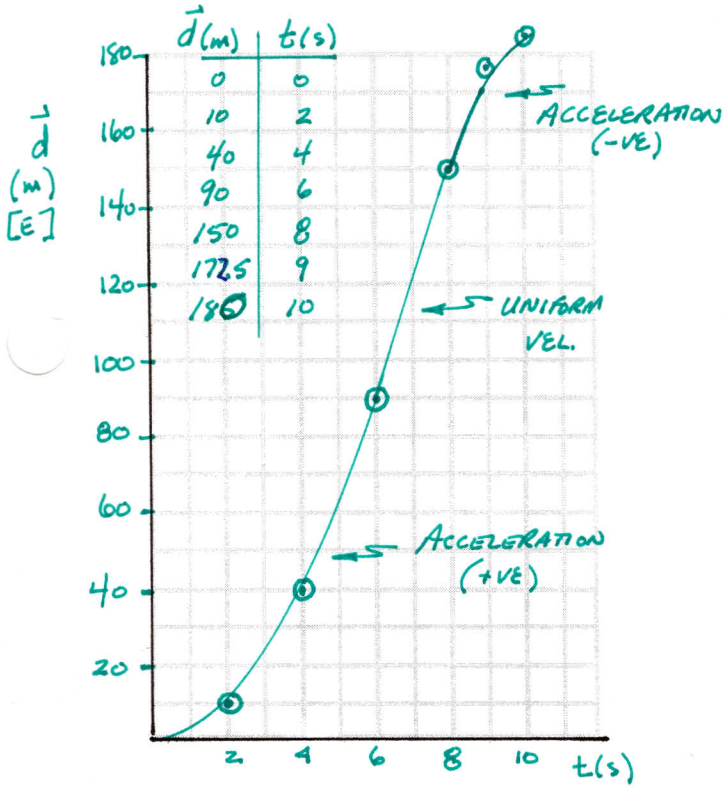
   a. What is the average acceleration of the cheetah during the first 6.0 s? $5.0\ m/s^2\ [E]$

$\vec{V}$ UNIFORM b. What is the cheetah doing over the next 2.0 s?

   c. Determine the average acceleration of the cheetah during the final 2.0 s. $-15\ m/s^2\ [E]$

   d. When does the cheetah change direction during the chase? NEVER

   e. Plot a position-time graph below, assuming that at t=0 s the cheetah was at the reference point.



$\vec{d}$ (m)	t (s)
0	0
10	2
40	4
90	6
150	8
172.5	9
180	10

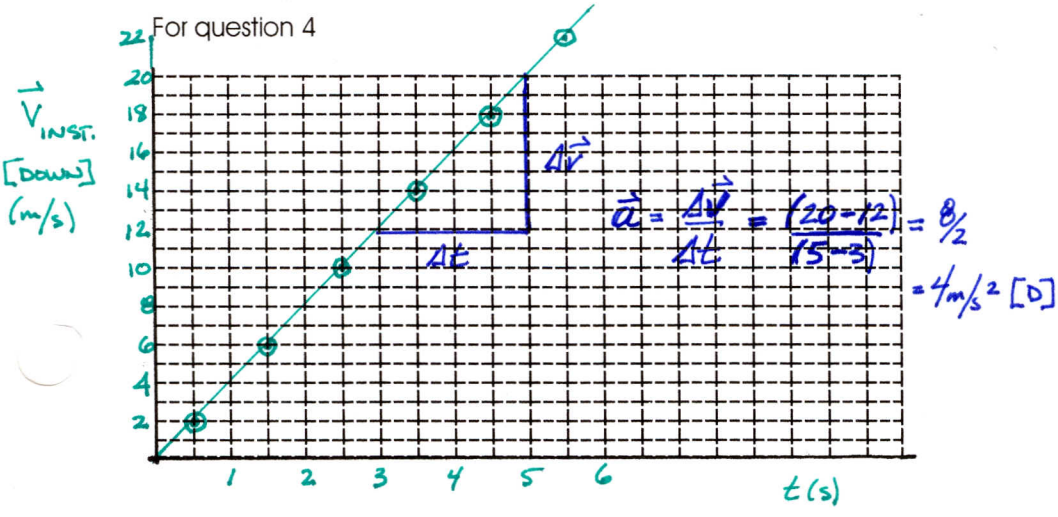
2. Read pp. 24-26. Do p. 26 #2 and the Try This Activity, parts (a) and (b)

3. Read pp. 29-30. Do p. 30 #10

4. Given the following position-time data, determine the acceleration of the object.

Position, (m) [down]	Time (s)
0	0.0
2	1.0
8	2.0
18	3.0
32	4.0
50	5.0
72	6.0

For question 4



$\vec{V}_{INST}$ (m/s) [DOWN]	Δt (s)
2.0	0.50
6.0	1.50
10.0	2.50
14.0	3.50
18.0	4.50
22.0	5.50

p. 26

#2 (a) The object accelerates from rest in the positive direction. After a period of time it travels with a constant positive velocity

(b) The object was moving uniformly in a +ve direction. A short time later, the object had a -ve acceleration (yet kept moving in a +ve direction) until its velocity became zero.

(c) The object accelerated uniformly from rest, travelling in the positive direction. After a period of time it changed its acceleration all the while travelling in a positive direction.

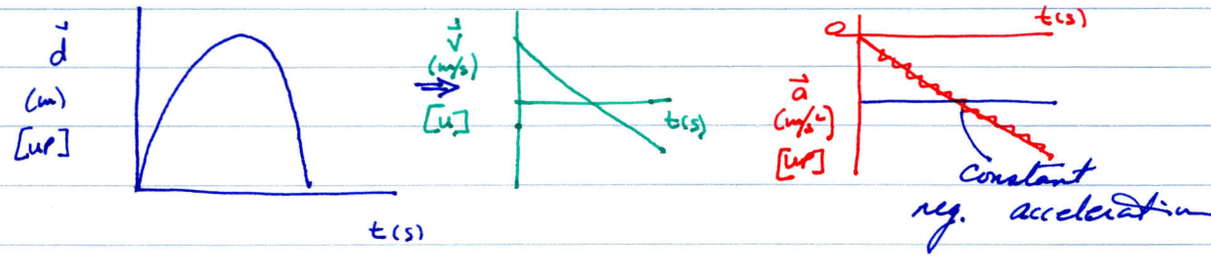
p. 26

#3

UP RAMP (slows down)

DOWN RAMP (speeds up)

Combining (a) + (b).



p. 30 #10

(a) $\vec{v}_{@}$ t = 0.40 s $\rightarrow$ 2.0 m/s [E]

$\vec{v}_{@}$ t = 0.80 s $\rightarrow$ 1.0 m/s [E]

(b) $\vec{a}_{avg}$ between t = 0 and t = 0.60 s $\rightarrow$ slope of line $= \frac{(0-6)}{(0.6-0)} = 10\ m/s^2\ [W]$

(c) $\vec{a}_{avg}$ between t = 0.6 and t = 1.4 s $\rightarrow$ slope of line $= \frac{(4-0)}{(1.4-0.6)} = 5.0\ m/s^2\ [E]$

(d) $\vec{a}_{avg}$ between t = 0.80 and t = 1.20 s $\rightarrow$ same slope as in (c) $\therefore$ 5.0 m/s² [E]